DEPARTMENT OF LAND RECORDS AND AGRICULTURE, BENGAL.

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ANNUAL REPORT

OF THE

SIBPUR EXPERIMENTAL FARM

FOR

1893-94.

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ANNUAL REPORT OF THE SIBPUR EXPERIMENTAL FARM FOR 1893-94.

1. It is necessary to preface the report with a few words relating to the objects of the experiments which were made last year on the Sibpur farm. It will be remembered that Dr. Voelcker visited the farm in 1890; he considered the soil of the farm to be too rich to be suitable for experiments, as unmanured plots of land often returned larger yields than plots which had been heavily manured. This result may be partly due to the land being too rich to be capable of being benefited by manures, and partly to the land being "made land," that is, artificially levelled and filled in. It appeared to be useless under the circumstances to conduct any comprehensive manurial experiments such as those usually carried on at other experimental farms. In such experiments a number of different manures are tried on an equal number of plots occupying a considerable area of land which should be of uniform quality. This condition is essential not only to manurial experiments, but to all others of a comparative nature, *e g.*, experiments which are directed to test the relative merits of different methods of cultivation. But for reasons already explained, this condition it is at present difficult to secure on the Sibpur farm. Dr. Voelcker has also laid special stress on the importance of duplicating experiments, which would enable correct conclusions to be drawn to a certain extent. The programme of experiments carried out at Sibpur during 1893-94 was prepared with reference to the facts and suggestion noted above. The scope of manurial experiments was considerably restricted; and care was taken to confine the comparative experiments made during the year, within small areas, so as to ensure evenness of soil, and to have them duplicated in every instance. At the same time I have been trying during the last two years to prepare a large area on the farm for future experiments by having it levelled and cropped without manure. It is believed that by continued cropping without manure for two or three years longer, the land will be rendered more suitable for experiment than it was in the beginning.

2. The following comparative experiments were made during the year:—

(1) An experiment to determine the effect of saltpetre as compared with that of castorcake on sugarcane. The experiment was made in duplicate on four plots of land, each plot being divided into two equal parts, one-half of which was treated with saltpetre at the rate of 6 maunds per acre, and the other with castorcake at the rate of 18 maunds per acre. The results of the experiment were as follow:—

Plot No.	Plot's area in acres.	Special treatment.	Outturn of jaggery per acre Mds.	s.	c.
F_1 R_3	P_3N $\frac{1}{12}$	Saltpetre, 6 maunds per acre ...	36	3	0
	P_3S „	Castor-cake, 18 maunds per acre ...	41	5	8
F_1 R_3	P_4S „	Saltpetre, 6 maunds per acre ...	44	7	0
	P_4N „	Castor-cake, 18 maunds per acre ...	41	1	0
		Average for saltpetre	40	5	0
		„ for castor-cake	41	3	4

The crop was much damaged by the excessive rains of 1893; and hence the outturn was much lower than usual. From the results as set forth above, it will be seen castor-cake gave on the average a slightly larger yield than saltpetre. It is believed that much of the saltpetre was wasted away by heavy showers which fell throughout the hot weather of 1893, otherwise the influence of the manure would have been more apparent.

(2) An experiment to test the effect of saltpetre on cabbage, as compared with that of castor-cake. For this purpose two plots of land were selected; each of these was divided into two equal halves, one of which was dressed with saltpetre at the rate of 12 maunds costing Rs. 51 per acre, and the other half with castor-cake at the rate of 30 maunds costing Rs. 57 per acre.

In one plot, the two contrasted halves were even in appearance; but there was great difference between the contrasted halves of the other plot. The half manured with saltpetre grew far ahead of the half manured with castor-cake; the latter became a prey to insects which did comparatively little damage to the former. This result was due, it is believed, solely to the influence of saltpetre which forced the growth of the crop and enabled it to resist the attack of insects better than oil-cake.

The usefulness of saltpetre as a manure for cabbage had been also borne out by an experiment made at the Sibpur farm during the previous year (*vide* page 23 of Annual Report for 1892-93). Cabbage is largely grown in the neighbourhood of the Sibpur farm. Last year I prevailed upon a cultivator to try saltpetre on a portion of his cabbage crop; I am glad to be able to report that this man was more than satisfied with the result; he tells me the plants manured with saltpetre formed larger heads and more quickly than those treated with oil-cake. Many neighbouring cultivators came to see his crop, and a few have promised to use saltpetre in the next season.

(3). An experiment was made in duplicate in four plots of land to compare deep with shallow ploughing. The deep ploughed plots were ploughed with a Sibpur plough followed by a country plough in its rear, and were loosened to the depth of 9 inches; the shallow ploughed plots were ploughed with the country plough which reached to the depth of 5 inches. The crops grown were jute and barley. This experiment will be continued for a number of years in case it be decided to maintain the farm. The results of the experiment were as follow:—

Plot No.	Plot area in acres.	Special treatment.	Outturn per acre.					
			Jute			Barley.		
			Mds.	s.	c.	Mds.	s.	c.
F_2 R_4 P_2	$\frac{1}{6}$	Deep cultivation 9″ ...	5	10	0	6	15	0
F_2 R_4 P_4	$\frac{1}{6}$	Ditto ...	3	9	0	11	17	8
F_2 R_4 P_3	$\frac{1}{6}$	Shallow cultivation 6″ ...	8	28	0	10	27	8
F_2 R_4 P_5	$\frac{1}{6}$	Ditto ...	12	18	0	13	29	0

The jute crop in the first two plots almost failed, owing to excessive rainfall, and the succeeding crop of barley was also much affected by want of rainfall during the rabi season of 1893-94. Deep cultivation appears to have given a decidedly less outturn in every case. The

esult is contrary to ordinary expectations; the experiment is, however, one which should be continued for several years before any conclusions can be drawn.

(4). An experiment was made in duplicate to compare the method of planting potatoes in double rows, as is frequently done in the districts of North Bengal, with the ordinary method of planting in single rows. Two plots were planted in double rows, the sets being placed in two parallel lines 6 inches apart, the distance between the furrows being 3 feet; two other plots were planted in single rows as usual, the distance between the furrows being 2 feet. The former naturally required one-third more seed potatoes than the latter. The results are shown below :—

Plot No.	Plot area.	Special treatment.	Outturn per acre.
			Mds s. c.
F_7 R_1 1 P_1	$\frac{15}{120}$	Planted in double rows ...	159 13 13
F_7 R_1 1 P_2	„	Ditto in single rows ...	123 20 12
F_7 R_2 2 P_2	„	Ditto in double rows ...	163 4 10
F_7 R_2 2 P_1	„	Ditto in single rows ...	128 26 2
		Average of the two plots planted in double rows ...	161 9 3
		Average of the two plots planted in single rows ...	126 3 7

Thus planting in double rows appears to have caused a considerable increase in the outturn of potatoes, although the proportion of increase in the outturn was less than the proportion of increase in the seed required. It is desired to continue this experiment for several years.

3. Besides the experiments noted above, several experiments relating to the cultivation of new crops or varieties of crops were made during the year under report. These were as follow : —

(1) *The khari variety of Sugarcane.*—It was remarked in the Annual Report for 1892-93 that this variety of sugarcane was well adapted for ratoon cultivation. It will be seen on reference to statement (g) of Appendix D to that report that a small plot of land measuring 2½ cottahs was planted with *khari* cane in 1891-92. The third crop after planting was obtained last year (1893-94) and gave an outturn of jaggery amounting to 55 maunds 14 seers to the acre, against 50 maunds 26½ seers in the first year and 70 maunds 32 seers in the second. There was a falling off in the outturn of the third crop as compared with the second, but it was believed to be due to the excessive rains of last year. Fresh shoots have again appeared in abundance, thus giving a good promise of a fourth crop in the current year. The experience gained with regard to this variety of sugarcane in the Burdwan and Sibpur farms shows that its cultivation is far more profitable than that of any other variety grown in Bengal. It ratoons freely and can be kept on for a number of years, while it enjoys remarkable immunity from drought and insect-pests. To put the merits of *khari* cane to a more thorough test than could be had from a small area like 2½ cottahs, four plots of land were planted

with this variety last year; the outturns of these plots were as follow:—

Plot Number.	Plot area in acres.	Special treatment.	Outturn per acre. Mds. Srs. Ch.
R3 P7	... $\frac{1}{15}$	Ordinary cultivation.	47 32 8
R4 P7	... $\frac{1}{12}$	„	60 39 0
R5 P7	... $\frac{1}{12}$	„	85 29 0
R5 P6	... $\frac{1}{8}$	„	48 16 0

The cuttings planted in the first three plots were obtained from the Burdwan farm, and those planted in the fourth were the produce of the Sibpur farm. Though belonging to the same variety, and possessing similar characteristics as regards growth, there was yet much difference in respect of the appearance and colour of the leaves between the crop grown from the cuttings imported from Burdwan, and that grown from cuttings of the variety hitherto grown on the Sibpur farm. The former also appeared to be more vigorous than the latter. It will be seen that, having regard to the unfavourable character of the year for the sugarcane crop, the outturn yielded by the four plots was very satisfactory. A new crop has come up again from the shoots, and is expected to yield a handsome outturn in the ensuing season.

(2) An experiment with four varieties of sugarcane confirmed the result obtained in previous years, that the red Saharanpur variety was in point of yield the most productive. The outturns of the four varieties during the past three years were as follow:—

Variety.	Outturn of gur, 1891-92 (Fresh crop). Mds. s. c.	Outturn of gur, 1892-93 (Ratoon). Mds. s. c.	Outturn of gur, 1893-94 (Fresh crop). Mds. s. c.
Red Saharanpur ...	74 1 0	68 22 0	100 32 0
Samsara	71 14 8	29 28 0	50 4 0
White Bombay ...	61 26 0	22 8 0	84 30 0
Pari	56 29 8	36 6 0	51 24 0

The figures given above afford abundant testimony of the marked superiority of the red Saharanpur (otherwise known as black Bombay) variety over the *samsara*, which is now the common variety grown everywhere in the country around Calcutta. Black Bombay used to be cultivated many years ago; but its susceptibility to injury by the "stalk borer" insect, and its liability to be blown down by high winds, have reduced its cultivation. At present it is seldom grown by itself, but is grown in mixture with *samsara* canes which serve as it were as its support.

(3) *Oats.*—This crop is almost new to Lower Bengal. A few planters have been known to grow it, but it does not appear to be grown by the raiyat anywhere in Lower Bengal. It has been successfully cultivated in the Sibpur farm since 1889-90. Last year oats were grown on 6¼ bighas of land; it was cultivated like wheat or barley and

received no manure. The crop suffered much from want of rainfall during the greater part of the cold weather and by the occurrence of a heavy hailstorm in the beginning of March 1893. The total outturn of grain was 20 maunds 31 seers 8 chitaks, or at the rate of 9 maunds 39 seers 2 chitaks per acre, against 20½ maunds per acre in 1892-93 and 19 maunds 33 seers in 1891-92.

Three varieties of Australian oats, the seed of which was procured through the Agri-Horticultural Society of India, were sown on the farm; the seed of two varieties failed to germinate; the third variety ("potato" oats) grew well but failed to seed.

(4) *Fodder grasses.*—The fodder crops cultivated last year were sorghum, reana or buffalo grass, and lucerne. Sorghum has been successfully grown on the farm since 1888-89. Last year it was raised on 1 bigha 18 cottahs of land; only one cutting was taken which amounted to 123 maunds, or at the rate of 194¼ maunds to the acre. The yield was comparatively poor on account of the excessive rains of last year which also prevented a second crop from being taken. The cost of cultivation amounted to Rs. 7-2, or about 11 pies per maund.

Reana was also successfully grown last year on a small plot of land. The cultivation of lucerne was not, however, quite successful. The crop occupied one-eighth of an acre; it was sown in the middle of November, and yielded its first cutting in April last. It amounted to 12½ maunds of fodder, that is, at the rate of 100 maunds to the acre. A portion of the land was discovered to be infected with common salt and lay bare; hence the outturn was not fully satisfactory.

In the Resolution of Government on the Annual Report for 1891-92 (paragraph 7), it is said that the Board of Revenue observed that a large sorghum farm near Calcutta was likely to be a paying concern. It is a matter of great satisfaction to report that a well known native gentleman, Babu Bhabo Nath Sen, the lessee of the Calcutta municipal lands at the Salt Lakes, has started a small fodder farm at that place. He cultivates reana and sorghum, chiefly the former, and sells the fodder to the Calcutta Municipal *Gowkhana* at five annas per maund of green stuff. At present he has 20 bighas under cultivation. I infer from what I saw and heard from him that the venture has been found to be profitable. As yet the *goalas* of the town have not shown any appreciation of green fodder grasses.

(5). *Tobacco.*—It was mentioned in the Annual Report for 1892-93 that four varieties of tobacco, namely, *Havana*, *hingli*, *Rangpur* and *Matihar* were grown on the Sibpur farm in that year. They were manured with saltpetre and sulphate of potash which supplied potash, and was therefore believed to improve the burning quality of the leaf. The leaves were cured in the shade, and I adhered as closely as I could to the directions prescribed for shade-curing in America, and advocated for adoption in this country. The *Matihar* variety was extremely coarse and fit only for use in *chilum*. Samples of leaf of the other three varieties were submitted for appraisement to the Agri-Horticultural Society of India, who furnished the following opinion of an expert:—"The leaves have every appearance of being shade-dried and cured, which is not a suitable process for cigar tobacco. All the samples are deficient in texture; this is in a measure

due to shade-curing. The *Rangpur* samples burn very badly, and contain a large proportion of chlorine, the best samples are those of *Havana* and *hingli* tobacco, and with care exercised in sun-curing and subsequent fermentation, the former might be found suitable for cigar-fillers, and the latter would be suitable for either pipe or cigarette tobacco. In their present state none of the present samples are of use for the manufacture of cigars." Contrary to expectations, the practice of shade-curing was condemned and sun-curing was recommended for tobacco intended for cigar manufacture. The opinion with regard to *Havana* and *hingli* tobacco, though not quite favourable, was hopeful. I was, therefore, induced to continue the experiment with tobacco during the year under report. Ten different varieties of tobacco were sown. These were *hingli*, *Havana*, *Rangpur*, two varieties from Baroda, *Dindigal*, *Sumatra*, *Landreths*, *Big Frederick* and *white Burleigh*. The last three varieties were American. *Big Frederick*, *white Burleigh* and *Sumatra* did not germinate well and gave only a few plants. But all the other varieties grew well. The characteristics of the first three varieties, as they were observed during growth, were described in the Annual Report for 1892-93. Of the two varieties from Baroda, one was very much like the *hingli*, the other had large thick broad leaves, having a crumpled appearance, and looked very promising. The *Dindigal* was no other than an acclimatised form of *Havana* tobacco. The variety which grew best and promised the largest outturn was Landreths. It had very large but thin leaves with small midribs and veins, that is, just the ideal kind of leaves for cigar wrappers. This variety, however, appeared to be later in ripening than all others.

But unfortunately the tobacco crop on the farm was utterly spoiled by two severe hailstorms on the 5th and 11th March, which tore the leaves into shreds. Only a small portion of the crop containing leaves of two varieties, *hingli* and *Havana* had been harvested before the storm and thus saved from injury. A portion of the leaves thus saved has been cured in the sun and the rest in the shade. They are now lying in bulk for fermentation, and as soon as they are ready, samples will be submitted to an expert for opinion, which will be duly communicated to Government. I have saved seed for sowing in the current year, and propose, if permitted, to continue the cultivation of tobacco for a number of years with the ultimate object of producing a leaf suitable for European use.

4. *Seed drill.*—The seed drill invented by me, of which mention was made in page 21 of the Annual Report for 1892-93, was tried last year on two plots of land, one sown with wheat and the other with barley. The germination of the seed in each case was as regular as could be desired. I was unable, however, to put the machine to a more thorough test than what could be made on the Sibpur farm. I propose to do this at the next *rabi* sowings.

5. *Conservation of manure*—.Great care was exercised as in the previous year in the conservation of manure, and an experiment has been undertaken at Dr. Leather's suggestion to ascertain the quantity and quality of manure produced by a given number of bullocks in a year.

6. *Insecticide.*—An experiment made with different kinds of grains fully bore out the experience gained in the previous year as to the

great value of bisulphide of carbon for protecting them from weevils and other insects.

7. *Receipts and expenditure.*—The receipts and expenditure of the farm during 1893-94 are shown in the statement which follows. The gross expenditure was Rs. 2,433-12-9 against Rs. 2,979-0-7 in the previous year. The actual cost of cultivation amounted to Rs. 1,381-4-6, out of which Rs. 916-4-9 was recovered by sale of agricultural produce. The actual cost of maintaining the farm last year amounted to Rs. 1,420-3-0, against Rs. 1,753-11-1 in the previous year.

8. The Sibpur farm was visited by Dr. Leather, Agricultural Chemist to the Government of India, in February last. He considers the site and soil of the farm to be unsuitable for an expiremental farm, and supports the proposal to convert it into a dairy farm.

Receipts and Expenditure of the Sibpur Farm during 1893-94.

Receipts.	Rs.	A.	P.
Produce of cultivation ...	916	4	9
„ from miscellaneous sources	97	5	0
Total ...	1,013	9	9
Actual cost to Government	1,420	3	0
GRAND TOTAL ...	2,433	12	9

Expenditure.	Rs.	A.	P.
Cost of cultivation—			
Labour	872	6	0
Feed of cattle ...	89	15	9
Implements ...	55	15	9
Seeds	150	0	9
Manures	212	14	3
Total ...	1,381	4	6
Salary of overseer ...	600	0	0
Repairs to roads ...	11	0	9
„ „ sheds ...	42	14	6
„ „ canals ...	10	0	0
Municipal taxes ...	232	8	0
Miscellaneous expenses	156	1	0
Total ...	1,052	8	3
GRAND TOTAL ...	2,433	12	9

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DEPARTMENT OF LAND RECORDS AND AGRICULTURE, BENGAL,

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